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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/754,011	01/08/2004	Paul Reuben Day	ROC920030217US1	7133

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EXAMINER	
LOVEL, KIMBERLY M	

ART UNIT	PAPER NUMBER
2167	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/754,011	DAY ET AL.	
	Examiner	Art Unit	
	Kimberly Lovel	2167	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 July 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-5,7-10,13 and 15-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *, 3-5, 7-10, 13 and 15-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1, 3-5, 7-10, 14 and 15-24 are pending. Claims 2, 6, 11, 12, and 14 have been canceled.

Continued Examination Under 37 CFR 1.114

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 5 July 2007 has been entered.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation

under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1-6, 9-15 and 18-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No 5,875,447 to Goel et al (hereafter Goel et al) in view of US Patent No 6,757677 to Pham et al (hereafter Pham et al).

Referring to claim 1, Goel et al discloses a method for optimizing a database query, the database query including criteria that references a plurality of tables in order to re-order a result set generated for the database query (see abstract), the method comprising the steps of: applying transitive closure analysis to the query (see column 3, lines 26-30). However, Goel et al fail to explicitly teach the further limitations of wherein the criteria is one of GROUP BY clause and OREDER BY clause; identifying an equivalent field for a field referenced in the criteria; and based on the transitive closure analysis, rewriting the criteria to generate modified criteria to reduce the number of tables referenced thereby by substituting the equivalent field for the field referenced in the criteria to generate modified criteria that references only one table, based on transitive closure analysis. Pham et al disclose an optimizer that is able to consider group-by operations as part of the optimization of a join (see abstract) including the further limitation of based on the transitive closure analysis, rewriting the criteria to generate modified criteria (see column 2, lines 35-48 and column 9, lines 9-13 – the where clause is considered to represent the transient closure).

It would have been obvious to one of ordinary skill in the at the time the invention was made to use Pham et al's optimizer with the method for the reordering of complex SQL queries involving group-bys and joins. One would have been motivated to do so in order to improve efficiency concerning the processing of complex SQL queries that contain Group-bys (Goel et al: see column 3, lines 17-19).

The combination of Goel and Pham (hereafter Goel/Pham) fail to explicitly disclose the further limitations of wherein the criteria is one of GROUP BY clause and OREDER BY clause; identifying an equivalent field for a field referenced in the criteria; and based on the transitive closure analysis, rewriting the criteria to generate modified criteria to reduce the number of tables referenced thereby by substituting the equivalent field for the field referenced in the criteria to generate modified criteria that references only one table, based on transitive closure analysis. Tao discloses restructuring queries (see abstract), including the further limitations of wherein the criteria is one of GROUP BY clause and OREDER BY clause; identifying an equivalent field for a field referenced in the criteria; and based on the transitive closure analysis, rewriting the criteria to generate modified criteria to reduce the number of tables referenced thereby by substituting the equivalent field for the field referenced in the criteria to generate modified criteria that references only one table, based on transitive closure analysis (see column 7, lines 10-19; column 8, lines 9-18; and column 8, lines 43-60).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the steps of applying transitive closure to grouping functions as disclosed by Tao with the transitive closure step disclosed by Goel/Pham. One would

have been motivated to do so in order to increase the efficiency and run-time of the query through query optimization.

Referring to claim 3, the combination of Goel/Pham and Tao (hereafter Goel/Pham/Tao) discloses the method according to claim 1, further comprising the step of: determining if the criteria references a first field from a first table and a second field from a second table (Pham et al: see column 3, lines 30-50 – x1 is considered to represent the first field from the first table; y3 is considered to represent the second field from a second table).

Referring to claim 4, Goel/Pham/Tao discloses the method according to claim 3, wherein the rewriting step comprises the step of: rewriting the criteria to reference the first field and a third field from the first table, wherein a first search condition in the query searches on a match between the first field and the second field, and a second search condition in the query searches on a match between the second field and the third field, and where applying transitive closure analysis includes determining that the third field is equivalent to the second field in the criteria (Pham et al: see column 5, lines 47-65; Tao: see column 7, lines 10-19; column 8, lines 9-18; and column 8, lines 43-60).

Referring to claim 5, Goel/Pham/Tao discloses the method according to claim 1, further comprising the step of: determining if the criteria references a plurality of tables (Pham et al: see column 4, line 58 – column 5, line 13).

Referring to claim 9, Goel/Pham/Tao discloses the method according to claim 1, wherein the database query involves a plurality of join operations and the method

further comprises the step of: running the query according to a join order that is based on the modified criteria (Pham et al: see column 6, lines 46-54).

Referring to claim 10, Goel et al discloses a method of optimizing a database query, the database query including criteria that operates to re-order a result set of the database query and requires creating a temporary file during operation (see abstract); the method comprising the steps of: applying transitive closure analysis to the query (see column 3, lines 26-30). However, Goel et al fail to explicitly teach the further limitations of based on the transitive closure analysis, rewriting the criteria to generate modified criteria to reduce the number of tables referenced thereby and said modified criteria operating to re-order a result set of the database query and avoid creating a temporary file during operation. Pham et al disclose an optimizer that is able to consider group-by operations as part of the optimization of a join (see abstract) including the further limitations of rewriting the criteria, based on the transitive closure analysis, to generate a modified criteria (see column 2, lines 35-48 and column 9, lines 9-13 – the where clause is considered to represent the transient closure); said modified criteria operating to re-order a result set of the database query and avoid creating a temporary file during operation (see column 6, lines 46-65).

It would have been obvious to one of ordinary skill in the at the time the invention was made to use Pham et al's optimizer with the method for the reordering of complex SQL queries involving group-bys and joins. One would have been motivated to do so in order to improve efficiency concerning the processing of complex SQL queries that contain Group-bys (Goel et al: see column 3, lines 17-19).

The combination of Goel/Pham fails to explicitly disclose the further limitations of wherein the criteria is one of GROUP BY clause and OREDER BY clause; identifying an equivalent field for a field referenced in the criteria; and rewriting the criteria, based on the transitive closure analysis, to generate modified criteria, wherein the criteria references a plurality of tables and modified criteria references a single table. Tao discloses restructuring queries (see abstract), including the further limitations of wherein the criteria is one of GROUP BY clause and OREDER BY clause; identifying an equivalent field for a field referenced in the criteria; and rewriting the criteria, based on the transitive closure analysis, to generate modified criteria, wherein the criteria references a plurality of tables and modified criteria references a single table (see column 7, lines 10-19; column 8, lines 9-18; and column 8, lines 43-60).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the steps of applying transitive closure to grouping functions as disclosed by Tao with the transitive closure step disclosed by Goel/Pham. One would have been motivated to do so in order to increase the efficiency and run-time of the query through query optimization.

Referring to claim 13, Goel et al discloses a method for optimizing a database query, the database query involving a plurality of join operations and a plurality of search conditions, (see abstract); the method comprising the steps of: applying transitive closure analysis to the plurality of search conditions to determine a subset of equivalent search fields (see column 3, lines 26-30). However, Goel et al fail to explicitly teach the further limitation of rewriting a criteria, that operates to re-order a

result set of the database query, to generate a set of respective modified criteria that each reference one or more equivalent search fields. Pham et al disclose an optimizer that is able to consider group-by operations as part of the optimization of a join (see abstract) including the further limitation rewriting a criteria, that operates.to re-order a result set of the database query, to generate a set of respective modified criteria that each reference one or more equivalent search fields (see column 2, lines 35-48 and column 9, lines 9-13 – the where clause is considered to represent the transient closure).

It would have been obvious to one of ordinary skill in the at the time the invention was made to use Pham et al's optimizer with the method for the reordering of complex SQL queries involving group-bys and joins. One would have been motivated to do so in order to improve efficiency concerning the processing of complex SQL queries that contain Group-bys (Goel et al: see column 3, lines 17-19).

The combination of Goel/Pham fails to explicitly disclose the further limitations of wherein the criteria is one of GROUP BY clause and OREDER BY clause and selecting a join order from among a plurality of join ordered for the plurality of join operations, including analyzing join orders using at least one of the set of respective modified criteria. Tao discloses restructuring queries (see abstract), including the further limitations of wherein the criteria is one of GROUP BY clause and OREDER BY clause and selecting a join order from among a plurality of join ordered for the plurality of join operations, including analyzing join orders using at least one of the set of respective

modified criteria (see column 7, lines 10-19; column 8, lines 9-18; and column 8, lines 43-60).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the steps of applying transitive closure to grouping functions as disclosed by Tao with the transitive closure step disclosed by Goel/Pham. One would have been motivated to do so in order to increase the efficiency and run-time of the query through query optimization.

Referring to claim 15, Goel/Pham/Tao discloses the method according to claim 13; further comprising the step of: running the query according to a join order, the join order determined by selecting one of the set of respective modified criteria (Pham et al: see column 14, lines 42-61).

Referring to claim 18, Goel/Pham/Tao discloses the method according to claim 17, further comprising the step of: running the query according to a join order, the join order determined by selecting one of the subset of respective modified criteria (Pham et al: see column 13, line 41 – column 14, line 18).

Referring to claim 19, Goel/Pham/Tao discloses method according to claim 13, further comprising the steps of:

performing cost analysis on each of the set of respective modified criteria (Goel et al: see column 15, lines 20-25); and

running the query according to a join order, the join order determined based on the cost analysis (Goel et al: see column 15, lines 20-25).

Referring to claim 20, Goel/Pham/Tao discloses a program product comprising a recordable physical, computer readable storage medium bearing the program code (Goel et al: see column 8, lines 59-64). Therefore, the program product of claim 20 is rejected on the same grounds as the method of claim 1.

Referring to claim 21, Goel/Pham/Tao discloses the program product of claim 20, wherein the program code is further configured to: run the query according to a join order that is based on the modified criteria (Pham et al: see column 6, line 46-54 – modifying the group-by clause).

Referring to claim 22, Goel/Pham/Tao discloses a program product comprising a recordable physical, computer readable storage medium bearing the program code (Goel et al: see column 8, lines 59-64). Therefore, the program product of claim 22 is rejected on the same grounds as the method of claim 13.

Referring to claim 23, Goel/Pham/Tao discloses the program product of claim 22, wherein the program code is further configured to: run the query according to a join order that is based on the modified criteria (Pham et al: see column 6, line 46-54 – modifying the group-by clause).

Referring to claim 24, Goel/Pham/Tao discloses an apparatus comprising a processor (Pham et al: see column 16, lines 57-60) coupled to a memory (Pham et al: see column 16, lines 53-57 – storage unit). Therefore, the apparatus of claim 24 is rejected on the same grounds as the method of claim 1.

4. Claims 7-8 and 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No 5,875,447 to Goel et al (hereafter Goel et al) in view of US Patent No 6,757677 to Pham et al in view of US Patent No 7,191,169 to Tao as applied respectively to claims 6, 1 and 13 above, and further in view of US Patent No 5,598,559 to Chaudhuri.

Referring to claim 7, Goel/Pham discloses a method for optimizing a database query. However, Goel/Pham fails to explicitly disclose the further limitation of building an index over a column of the one table. Chaudhuri discloses a method for optimizing queries having group-by operations (see abstract), including the further limitation of building an index over a column of the one table (see column 7, line 55 – column 8, line 26).

It would have been obvious to one of ordinary skill in the at the time the invention was made to use Chaudhuri's step of indexing the tables as a subcomponent to the method for the reordering of complex SQL queries involving group-bys and joins. One would have been motivated to do so in order to improve efficiency concerning the processing of complex SQL queries that contain Group-bys (Goel et al: see column 3, lines 17-19).

Referring to claim 8, Goel/Pham discloses a method for optimizing a database query. However, Goel/Pham fails to explicitly disclose the further limitation of building an index over more than one column of a table among a plurality of tables. Chaudhuri discloses a method for optimizing queries having group-by operations (see abstract),

including the further limitation of building an index over more than one column of a table among a plurality of tables (see column 7, line 55 – column 8, line 26).

It would have been obvious to one of ordinary skill in the at the time the invention was made to use Chaudhuri's step of indexing the tables as a subcomponent to the method for the reordering of complex SQL queries involving group-bys and joins. One would have been motivated to do so in order to improve efficiency concerning the processing of complex SQL queries that contain Group-bys (Goel et al: see column 3, lines 17-19).

Referring to claim 16, Goel/Pham discloses a method for optimizing a database query. However, Goel/Pham fails to explicitly disclose the further limitation of identifying a subset of the respective modified criteria that reference a single, respective table and for which an index to that table exists. Chaudhuri discloses a method for optimizing queries having group-by operations (see abstract), including the further limitation of identifying a subset of the respective modified criteria that reference a single, respective table and for which an index to that table exists (see column 4, line 60 – column 5, line 25 and column 7, line 55 – column 8, line 26).

It would have been obvious to one of ordinary skill in the at the time the invention was made to use Chaudhuri's step of identifying subsets as a subcomponent to the method for the reordering of complex SQL queries involving group-bys and joins. One would have been motivated to do so in order to improve efficiency concerning the processing of complex SQL queries that contain Group-bys (Goel et al: see column 3, lines 17-19).

Referring to claim 17, Goel/Pham discloses a method for optimizing a database query. However, Goel/Pham fails to explicitly disclose the further limitation of identifying a subset of the respective modified criteria that reference a single, respective table and for which an index is to be created. Chaudhuri discloses a method for optimizing queries having group-by operations (see abstract), including the further limitation of identifying a subset of the respective modified criteria that reference a single, respective table and for which an index is to be created (see column 4, line 60 – column 5, line 25 and column 7, line 55 – column 8, line 26).

It would have been obvious to one of ordinary skill in the at the time the invention was made to use Chaudhuri's step of identifying subsets as a subcomponent to the method for the reordering of complex SQL queries involving group-bys and joins. One would have been motivated to do so in order to improve efficiency concerning the processing of complex SQL queries that contain Group-bys (Goel et al: see column 3, lines 17-19).

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- US Patent No 6,850,933 to Larson et al
- US Patent No 5,960,427 to Goel et al

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kimberly Lovel whose telephone number is (571) 272-2750. The examiner can normally be reached on 8:00 - 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Cottingham can be reached on (571) 272-7079. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Kimberly Lovel
Examiner
Art Unit 2167

15 September 2007
kml

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